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SUMMARY AND CONCLUSIONS

of

"Methods of Cutting Ponderosa Pine, Payette National Forest, Idaho"

Plots 1, 2, 3.

Progress Report, 1931

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Summary of Results

1. Three sample plots with a total area of 13.866 acres in the ponderosa pine type of the Payette National Forest in central Idaho were cut over by the seed-tree method in 1913. The operation removed 82.7 percent of the original stand of 18,380 bd.ft. per acre, leaving a reserve of 3,184 bd. ft. per acre. The reserve stand averaged 17.2 trees over 3.5 inches d.b.h; 18.66 sq. ft. of basal area; and 627.5 cu. ft. of total volume per acre.

2. In 1931 the stand averaged 85.7 trees per acre, 38.20 sq. ft. of basal area, 1129.2 cu. ft. of total volume, and 5,570 bd. ft. of merchantable volume.

3. Annual net increment per acre for the 17½-year period averaged 1.116 sq. ft. of basal area; 28.7 cu.ft.; or 136 bd. ft.

4. The average tree grew at a rate of 0.234 inches in diameter breast high per year. Ponderosa pine averaged 0.230 inches; Douglas fir, 0.264 inches.

5. The rate of increment of the reserve stand decreased through the three successive periods covered by the plot measurements, probably because of competition by the younger trees and reproduction and shortage of precipitation during the majority of recent years.

6. The stand was increased by the addition of 4.0 trees per acre per year growing into the 4-inch class. These "new trees" contributed 15.3 percent of the cubic-foot increment; only a negligible proportion of the board-foot increment.

7. The death of reserve trees has caused an average annual loss of 3.81 cu. ft. or 19.8 bd. ft. per acre. Seventy-four percent of the total volume loss was due to western pine barkbeetle attack. Windfall, logging injuries, and porcupine damage were the other causes of loss. The rate of mortality has been probressively increasing.

8. Analysis of increment of individual pine trees by silvicultural (Dunning) tree classes shows average annual increases in diameter as follows: Class 1 - .31"; 2 - .20"; 3 - .19"; 4 - .13"; 5 - (no trees lived through); 6 - .12"; 7 - .05". Tree classes 4 and 5 show a net loss in volume over the period as a result of mortality from insect attack.

9. The scheme of classifying residual trees according to release from competition proved to be unsatisfactory for showing the true acceleration of growth resulting from cutting. A comparison with similar trees in a virgin stand showed, however, that those on the selectively cut plots

were growing about fifty percent faster than the former.

10. Reproduction records are incomplete, but indicate a loss in advance reproduction with very little subsequent reproduction since the time of cutting. The scarcity of recent reproduction is common to other cut-over and virgin stands as well as this one, and is presumably due to lack of good seed years and deficiency in precipitation. At the last measurement (1931), the number of pine seedlings and saplings per acre averaged 492; Douglas fir, 104.

11. The accuracy of using periodic increment as a basis for prediction of growth on the plot itself was checked by projecting the actual rates of growth through succeeding periods covered by the three remeasurements of the plots. For the second period (1918-1926) the predicted net yields in cubic feet and board feet were each 5.5 percent higher than actual. For the third period thepredicted net yield in cubic feet corresponded very closely with the actual; net yield in board feet was 2.3 percent higher than actual.

12. Growth prediction by the "Meyer method" for the 17½-year period showed yields which were 32 percent low in basal area; 22 percent low in cubic-foot volume, and 11 percent low in board-foot volume compared with actual results.

Conclusions and Application

The method of cutting has resulted in a rate of growth of the reserve stand that compares favorably with any reported for ponderosa pine in this region and is

appreciably greater than the average for extensive areas with similar volumes of reserve. The net growth rates have been approximately the same over the same period as for a nearby virgin stand* the volume of which averaged 24,234 bd. ft. on these plots.

The marking practice in this cutting was essentially the same as that prescribed for such stands in present Forest Service timber sales**. Unless there should be a distinct change in the method or degree of cutting, the only modification of marking which might be suggested is a heavier cut in Class 4 and 5 trees, which here lost more volume than they gained. It is believed, however, that the mortality of Class 4 trees due to barkbeetle attack was abnormally great in this case, so that there may often be justification for reserving some of them where better trees are lacking to provide a larger, earlier, or better quality second cut.

The restocking of blank spots on the area has been far from satisfactory, but so few seedlings have become established since 1913 anywhere in this part of Idaho that this result is not a fair test of the method of cutting as to number and distribution of seed trees. The reservation of more seed trees would have increased slightly the stocking

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* See footnote, p. 16.
**Forest Management Handbook, Region 4, pp. 22-29. 1929. Mimeographed - U.S. Forest Service, Ogden, Utah.

of reproduction but might have been undesirable from other standpoints. There is such a liberal stocking of advance reproduction over many portions of the plots that the scarcity of subsequent reproduction is not as serious as it might be in other localities.

The comparison of actual and predicted increment demonstrates the variation in growth rate of a given stand from even one short period to the next and the error which may be involved in using increment of a few years as the basis for either short or long time growth predictions. The application of growth data for these plots to extensive areas will be treated in some detail in a subsequent report.